

Container Port Development Projects on The Java Sea, Indonesia

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ABSTRACT

Port Development Projects have a some positive and constructive conclusions, combined with certain recommendations, but only if I am familiar with, and have explored, all kinds of values in port development. I will explain the underpinning a potential problem in more detail and how it can be used, and of value, in world port cities where several common problems occur: particularly matters relating to economic growth, climate change and urbanisation.

First, economic growth and development are two of the essentials of the world's economy. They allow developing countries to trade abroad the commodities of their homeland and raise their economic standards. Fundamentally, the development of an economy and its accompanying population usually goes along with the increasing of quantities and infrastructures of ports[1]. This commercial advancement potential forms opportunities for port expansion, so allowing the port owner(s) to gain an increased number of benefits. In addition, since the port serves as a backbone of economic growth, it is very important to address this capacity problem in order to enlarge the growth of the national economy. Economic growth has several values over and above economics, such as reputational and societal.

Second, climate change is a big challenge to ports, both in developing and developed countries. The threat of flooding is imminent to those countries which are located in low-lying areas and deltas. Climate change engenders several effects, such as increased sea water levels (SWL), river floods, high waves, atmospheric greenhouse gases and tropical cyclone activities; all of which could devastate coastal areas and transportation systems. These effects will increase the number of climate-related risks, causing loss of life, social disruption and decreased economic standards and levels of activity. However, recent research revealed that, at this moment, a few port authorities have started to handle, or at least confront, the issue of climate change [1,2]. Climate change impacts have several dimensions such as safety, sustainability and accessibility.

Third, the process of urbanisation is very important. This process, in fact, will increase the excess of water surface run off, including maximum and minimum flows. The first indicators have shown that increasing land use is causing a decrease in water infiltration. This influence is crucial to be recognized as it will greatly impact water quality and ecosystems [3-5], urbanisation's embrace and impact several values such as safety, societal and accessibility.

In this paper will be on the Indonesia's port cities, and the potential conflicts arising between the port and city. One of the major challenges now, and in the future, is to balance and reconcile different values, as well as to find innovations which satisfactorily cover more than one value at a time. The aim of this research is to investigate how to effectively balance and reconcile different identified values and the conflicts which arise between port and city. In section 3-6, I will explaining what theory and references are used in this paper.

1. INTRODUCTION

Generally, problems in ports involve all kinds of pollution, water and land (port development), air quality, sedimentation, traffic congestion and commercial as well as public accessibility. Table 1 mentions several problems on the north coast of Java which

cases study are three big ports are located: Jakarta's TanjungPriok Port, Semarang's TanjungEmas Port and Surabaya's Tanjung Perak Port.

TanjungPriok Port as a part of National Capital Integrated Coastal Development (NCICD) planning (Great Garuda) involves

value conflicts produced by NCICD (Great Garuda). Dr.Victor Coenen explained, in his office, that the masterplan involved the design of the C-Dike which can block the accessibility to certain waterways. Port development, representing economic value, will be in conflict with flood protection from the C Dike (safety value).

The main purpose of NCICD (Great Garuda) is to stop flooding in Jakarta’s capital city, especially caused by any sea level rise. In Jakarta, floods were coming

from, and were caused by, the sea level rise as well as 13 rivers, heavy rain and groundwater extraction. Hence, sea dike parts A & B (western part of Jakarta) are under construction. If flooding is still an issue by 2030, then sea dike part C will be built (eastern part of Jakarta). However, sea dike part C will close the bay, and close the access of ships to Jakarta’s TanjungPriok Port. Such issues represent ‘conflicting values’, between economics and safety.

Table 1 : Problems of the North Coast of Java [23,24]

No	Problem	Jakarta City	Semarang City	Surabaya City
1	Flood	Local, from rising sea level and river, heavy rain and upstream region	Local flood inundation, river flood from upstream in south Semarang, sea water tide flood	-
2	Sea level rise	5.7 mm/year		
3	Land subsidence	- 7.5 cm/year on average - In some parts, even up to 17 cm/year	2 – 5 cm/year, causing damaging in infrastructure and inundated in some parts of coastal area	Some areas are located below sea level
4	Population density	The cities are growing rapidly and experiencing high population growth.		About 45 persons per hectare
5	Pollution	All kinds of pollution (water, air, & noise)		

The three of big ports (Jakarta’s TanjungPriok Port, Surabaya’s Tanjung Perak Port, and Semarang’s TanjungEmas Port) in Java will be assessed and evaluated through the Responsible Innovation model and dealing with conflicting values method.

These ports will be developed, because of the container cargo will be increasing until 2030 (see figure 4) and these ports are located in north of Java’s sea, an area has a lot of problems (see table 1)

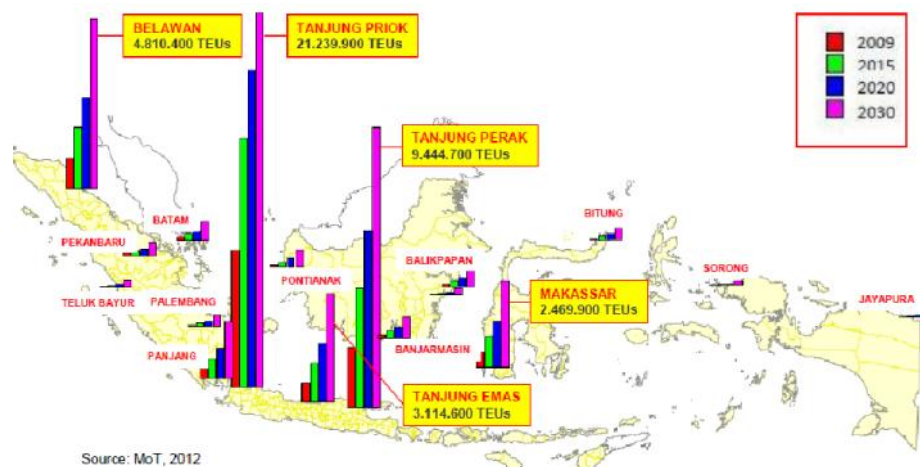


Figure 1 Container Traffic Projection in Major Ports in Indonesia, 2009-2030 (MOT)

1.1.Indonesia Archipelago[17-20]

Generally, 90% of Indonesia’s external trade is transported via sea. The nation is located between two continents and two oceans; hence a sea freight transport system is an important component of Indonesia’s economic growth and competitiveness, as well as of national integrity. Such a vital system has to be efficient and running well, because the costs are high and these outgoings reduce incentives to trade both domestically and internationally. Indonesia requires a greatly improved and efficiently run ports’ sector, because the efficiency of international ports has a significant impact on their competitiveness. In tandem, the efficiency of domestic ports has a significant impact on the inter-island trade flows[21].

Almost all of the world’s shipping lines pass through Indonesian maritime territory. Unfortunately, no Indonesian port is in the primary international port category that is acknowledged globally as able to serve international mother vessels. With reference to the issue of the nation’s economy, Indonesia does not have a port system that is adequate in terms of performance and service, in the views of its users. In general, ports in Indonesia are lacking deep-water, missing out on private sector participation (investment) and are not competitive. Indonesia has a port system which is organized into a hierarchy system of approximately 1700 ports, including the 25 main ‘strategic’ ports (see figure 2).



Figure 2. Nusantara Ship Route Network.

1.2.Java Island [22]

Indonesia has five big islands: Kalimantan, Papua, Sumatra, Sulawesi and Java. Java island contains 57% percent of the Indonesian population, and is the most populous island on earth (see figure 3). Java is one of the world’s most densely populated areas. The island averages more than 2,600 persons per square mile (1,000 per square km) and has more than half Indonesia’s

population in only 7 percent of the total land area of Indonesia. Jakarta, the capital city of Indonesia, is located in western Java. Jakarta, Semarang and Surabaya are fast growing cities in as measured by economic and population [ITB]. Java island has three big ports: Tanjung Priok in Jakarta, Tanjung Emas in Semarang, and Tanjung Perak in Surabaya.



Figure 3. Indonesia maps with spread of population

Indonesia has grown rapidly, using its ports as gateways to enter / exit of the country; in other words the ports are most important for the social and economic well-being of the nation. The economic growth of

Indonesia has been 5-6 percent during the last few years. The ports, as a gateway, have been facilitating economic growth (see figure 4).



Figure 4 Forecast Indonesian Container Cargo 2012-2030[21]

In this paper, the author will be focussing on Indonesian ports[17-19] , especially those in Java, taking into account the following:

- a. Indonesia is an archipelago and developing country; it has the 4th largest population in the world, 2nd longest coastline compared to all of the countries in the world and is the

7th largest country of land and sea relative to any other country in the world(see figure 5).

- b. Java island is the most populated island in Indonesia (see figure 2). Such a statistic suggests there would be significant unrest and potential disruption in response to social impact, environmental pollution, etc.,

if a new port development project were to be planned, constructed and operated in Java. At each phase of an infrastructure project, ie. during planning, construction and operation, the people and especially fishermen, will be considered and taken into account, in order to reduce public resistance.

- c. The big five ports (see figure 2) in Indonesia, as measured by volume of container cargo are: 1).TanjungPriok, 2). Tanjung Perak, 3). Belawan, 4). TanjungEmas and 5) Makassar. The big ports in Java attract, and will receive, the most attention in this research, because a lot of critical issues will be making themselves felt at the same time: port development (economic), flooding and sinking caused by sea level rise (safety and health), pollution (health) and social disruption (housing).

2. WORLD PORT CITIES

Jakarta's TanjungPriok as first case study, have a big ambisius to become a world-class port city; because the biggest port in Indonesia and not only as a transshipment but also as a gateway shipping from all of the world. In broder with Great Garuda plan as a new iconic city in Jakarta, than the ports have to do compromise with the new big capital city 'Jakarta Great Garuda'. A world-class port city can be determined and conceptualised as a centre in several ways; it is a place where people from different nationalities, with different spiritual and cultural backgrounds, meet. Port cities are a combining of port and city. A port system has a set of subsystems comprising : 1) port infrastructure, 2) economic structure, 3) institutions, 4) environmental which integrate with each other. Commonly, the port stakeholders consist of : 1) internal stakeholders (local & central) and the port authority and 2) external stakeholders (port companies & local community). The four external impacts (issues) which most commonly inform and influence port subsystems, there are : society, technology, economy and politics[6]. Almost 85% of world trade distribution relies on sea

transportation. For this reason, a world port city has to acknowledge certain values such as social, environmental and economic. An ideal port city would be a hub of logistics and supply chains; as well as a locality at the crossroads of accountability. It would also involve compliance and law enforcement systems such as customs, tax, policy and safety. Investments and capital, as well as manpower, are brought together in global port cities for the purpose of economic growth. Many port cities are where maritime traditions are continued together with plans for future development; therefore it is fair to suggest that port cities are hotspots of both cultural conservation and technological innovation. However, the world's port cities have lots of problems: on the one hand positive impact, and on the other hand negative impact. They create rather complicated and dramatic situations as both negative and positive values come into conflict with each other. In sub section 3.1., I will cite several world port cities, values relevant to their ports and how to balance actual or potential value conflicts.

3. LITERATURE STUDY

In this section, I want to mention a several major ports (sub section 3.1) in the world as a reference, regarding in their annual report. How are they concern and focusing on their report, how to make sustainable in port, and how to bring together with a several values and solve a concrete issue.

3.1. General characteristics of major ports

On this sub section I would explain a several major ports in the world as a reference to this dissertation, concern to explore of their issues, impacts and values. Several big international ports have been developed on the basis of sustainable port development:

3.1.1. The Port of Rotterdam

The port of Rotterdam (PoR), through Maasvlakte 2 projects, is working to become the European port that is handles its business operations in a sustainable and socially responsible way. The sustainability of the PoR is about balancing ecological, economic and social issues, demands and values. These dimensions are involved in all

phases of project assessment. In the annual report (Port of Rotterdam, 2008) the Environmental Impact Assessment (EIA) showed the environmental impact of the project's infrastructure and operation in fourteen categories : traffic and transport, noise, air, external security, water, light, nature, landscape, recreational combined use, marine safety and accessibility, the coast and the sea, environmental quality, functions and archaeology. The PoR authority committed itself to deal with those impacts using sustainable concepts at every stage, paying particular attention to: design, construction, layout, operation, energy and process industry, transport and dialogue[7,8].

3.1.2. The Port of Antwerp

The port of Antwerp (PoA), as the second biggest port in Europe, offers many aspects of sustainability; social and economic values are considered as central to the governing sustainability program. This program is designed to attract sustainable investment and involve stakeholders. However, economic development is the big issue of port policy in the 20st century. The PoA will need good management, because the port authority will have to do reduce their port's environmental impact in order to improve upon the port's previous operations. considered In order to ensure the port's future development it is essential to maintain a balance between people, economy (profit) and environment (planet) [7,9].

3.1.3. The Port of Los Angeles

The port of Los Angeles (PoLA) has been conforming to the Sustainability Assessment and Plan Formulation since June 2008, which explained the sustainability program's most important issues. PoLA has recognized the top priority concrete issues related to interactions with stakeholders. Concrete issues were determined by taking into account the following factors: the port's overall mission and competitive

strategy; key organizational values, policies, strategies, operational management systems, goals and targets; stakeholder concerns; and topics and future challenges for the port and goods movement industry (PoLA, 2011). Based on those factors, PoLA committed to adhere to responsible port development to mitigate any impacts during construction and operations related to the concrete issues of: public health risk, air quality, energy and climate change, water quality, stakeholder relationships, habitat protection, open space and urban greening, land use, local economic development, environmental justice and green growth[7,10]

3.1.4. The Port of Sydney

According to the annual sustainability report 2010-2011, the port of Sydney (PoS) has committed to be informed by six aspects of sustainability : energy resources, environment, community, people, growth and port operators including its supply chain [PoS. 2011]. The most important issue is to improve understanding of efficient resource use; especially electricity, natural gas, fuel and water usage as basic indicators to allow business to grow and reduce the port's actual and potential environmental impact. The PoS was active in opening public hearings with local communities andin establishing communication about the new port project.Also the port's management promised people it would learn more about sustainable concepts and would also develop the port's employees' skills relating to safety at work[7,11]

The fourth of major port which I mention above, that indicate ports in the world has a lot of issues (problem), and values, because of these ports are closed with city or called port cities, stakeholders and public values are most important. As a commonly, that the people in the city want to live with a clear of air, water and does not want all kind of pollution. The

ports will be produce of these problems, these situation will be lead and arises conflict between port and city.

4. TRADE-OFFS PORT AND CITY

Trade-offs between port and city are necessary during and after a port’s extension, as a result of the different interests of port and city. The port has a profit oriented priority focused on economic value, whereas the city has a priority relating to health, safety and zero pollution. With reference to case studies of the port cities of Hamburg and Rotterdam: “there is a need for relationships and coalitions between critical actors”[13]. World port cities offer great potential for conflicting values: the Great Garuda plan is one such example, involving both balance sheet and environmental quality. The question, therefore, is how these trade-offs could be best made. In addressing this question, dealing with conflicting values method will be used.

In this dissertation, the author will be focussing on the nation of Indonesia, because it is both an archipelago and developing country; it has the 4th largest population in the world, 2nd longest coastline compared to all of the countries in the world and is the 7th largest country of land and sea relative to any other country in the world(see figure 5).

5. PORT INNOVATION

5.1. Ports

Ports provide services which enable them to become multimodal nodes, and to connect one node to another. The activities in the ports usually take the form of deriving and distributing those services together, at the same time. As a result, the design of a port has to fulfil the requirement of handling transport economically, as well as becoming more efficient. The expectations of the ports’ infrastructures have to be matched with the increase of economic growth. Throughput will be focused more on a port’s infrastructure and container terminals, rather than its capacity. Ports are generally made up of several sections, such as large ‘load centres’, as well as smaller ‘feeder’ and ‘niche’ ports[12]. The port management models (see table 1) consist of four types: there are public service ports, tool ports, landlord ports and private service ports [13]. Public port management owns, develops and maintains infrastructure which is leased to private companies. Public port management is usually also responsible for regulatory function, as well as other functions, either private (majority) or public. All types of ports have to consider and be aware of social and environmental issues, because the water, air and noise pollution produced from a port, especially world port cities, has to be managed, a challenge which requires the port and city to be integrated.

Table 1. Port Management Models[13]

<i>Type</i>	<i>Infra Structure</i>	<i>Super Structure</i>	<i>Stevedoring Labour</i>	<i>Other Functions</i>
Public Service Port	Public	Public	Public	Mainly Public
Tool Port	Public	Public	Private	Mainly Public
Landlord Port	Public	Private	Private	Mainly Private
Private Service Port	Private	Private	Private	Mainly Private

5.2. Innovation[14]

5.2.1. Types of Innovation

Types of innovation based on definitions are:

1. Innovation is the profitable application of new ideas that

generate value and are profit oriented.

2. Innovation is the intersection of design and vision, making a new creation with consideration of social and economic value.

3. Innovation is the development of ‘turning ideas into values and perspectives’[14].

5.2.2. Degrees of Innovation

The classifications of degrees of innovation are:

1. Incremental adaptation (also called adaptive or efficiency innovation):
concern with the development that already exists, e.g.the improvement of guidelines for the solutions of current problems. This includes “... incremental changes such as cost reduction, quality or productivity improvements. It requires small investments and delivers small gains’[14].
2. Evolutionary innovation:
mainly handles the existing or new issues using ‘state-of-the-art approaches and techniques’ and is designed for new target markets. Feedback from customers, product mergers, new technologies, policy and strategies are becoming the latest issues to command attention.
3. Revolutionary or break-through innovation:
concerns about extremely new and/or much better ideas. This innovation is usually a result of radical ideas. However, it is often caused as a result of weak solutions to current problems.

6. INNOVATION TRAJECTORIES

6.1. Traditional

The use of innovation processes might make it easy to generate training and trials on site, as well as providing new information and technologies so that owners would necessarily spread those innovations. That is why the organisation of “public extension and development“

organisation should be arranged to contribute these services[15]

6.2. Innovation Trajectories

The impact of various projects (trajectories) in which different stakeholder organisations such as local and central government, port authorities, users and buyers, will exert influence on the owners to develop the practice of making innovative judgments, needs to be noted. To be specific, it is good for small owners is elaborated in several values[15]. This would imply that a conversation with an individual extension organisation is not an acceptable or optimal situation for Responsible Innovation to develop or be developed. The producers (owners) and also many other “economic agents”, such as private business companies and housing developers, create their decisions/or master plan in reaction to various conversations that take place, in order to get such information about the value or values of an innovation. Hence, the producers/owners would also reduce the risk of failure. In terms of “innovation trajectories” in the case of this Responsible Port Innovation study, we can split the diverse innovation trajectories that allow economic growth and minimise risks. There is: (a) Innovation through local users (domestic shipping); (b) Innovation through international buyers/exporters (international shipping); (c) Innovation through port authorities; (d). Innovation through local and central government and development cooperation; (e) Innovation through fishermen/or private fish companies; (f) Innovation through financing institutions (investors) and (g) Innovation through NGOs [15].

7. CONCLUDING REMARKS

7.1. The innovations in port are necessary to address several problems such as :

- 7.1.1. Economic growth[1]. Because economic growth would happen if the port had to make major extensions, so the port as a gateway would support the export and import of products and/or commodities between countries

and islands. Economic growth embraces several values, such as economical, reputational and societal.

- 7.1.2. Urbanisation has also become a major issue regarding the development of port cities [3-5], involving several values such as safety, societal and accessibility.
- 7.1.3. Climate change is a big challenge to ports, both in developing and other countries. It will increase the number of climate-related risks, potentially causing loss of life, social disruption and decreased economic standards. In response, as announced by recent research, at this moment a few port authorities have started to face the issue of climate change[1,2]. Climate change impinges upon certain values such as safety, sustainability and accessibility. "While some design requirements are formulated as requirements that can be met or not, others are formulated in terms of goals or values that can never be fully met. Most designs involve trade-offs between different design requirements. If the design requirements are motivated by different values these conflicts amount to value conflicts"[25].
- 7.2. Responsible innovation (RI) is becoming more and more important and relevant in relation to the big port extensions and other complex technology projects in Europe. However, in other parts of the world, especially in developing countries, including China and Indonesia, this approach is still very much in its beginning[21].
- 7.3. Ports, as new subject centres, are important as key components in facilitating economic growth, because "the efficiency of international and domestic ports has impact on the inter-island trade flows and competitiveness"[16].
- 7.4. Stakeholder engagement is the most important factor for Responsible Port Innovation, as stakeholders have

expanded their involvement in the innovation and its progress. Furthermore, the engagement requires two-way communication in order to maintain the commitments of the various parties.

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